

**Docket 2123-Util**

**APPLICATION**

**FOR UNITED STATES UTILITY PATENT**

**Self Actuated Cervical (Neck) Traction Device**

**SPECIFICATION**

## **RELATED APPLICATIONS**

[0001] This application claims the benefit of US Provisional Patent Application 60/400,125 filed on 08/02/02 and is herein incorporated by reference.

## **BACKGROUND OF THE INVENTION**

### **Field of the Invention**

[0002] The present invention relates to the traction devices. More particularly, this invention relates to a cervical traction device which may be employed by a patient in an out-patient or in-patient setting. The instant invention is known as the EasyTrak, TM. It was developed at the Spine Research Institute of San Diego.

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### **Description of the Invention**

[0003] Cervical traction stretches the muscles, ligaments, and discs of the neck. It provides relief by separating the spaces between the neck bones, which contain the nerves and disks, and may reduce pressure on the structures within the nerve openings. Cervical traction is not indicated for use in some conditions of instability such as fractures, dislocations, and some advanced disc problems.

[0004] Cervical traction is most helpful when used lying on the back with the neck placed in flexion (tilting forward). Using traction in this position helps stretch the muscles at the back of the neck and allow separation of the bones in the neck. This relieves pressure that may be pinching nerves and consequently, promotes

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muscle relaxation. Health care professionals often provide home traction programs for chronic cervical pain patients to encourage self management.

[0005] In order to provide a simple and easy to use home traction device the following self-actuated cervical (neck) traction device is provided.

[0006] The traction device includes a headpiece. This headpiece is unique and includes structure for supporting the neck in the most desirable position for cervical traction. A description of the structure follows.

[0007] The headpiece includes a rear element, the rear element being generally rectangular. The rear element is manufactured from a comfortable fabric, including, but not limited to, neoprene rubber.

[0008] The rear element has a front side which is designed to be placed against the neck and a back side which does not come in contact with the neck.

[0009] The back side of the rear element includes a nylon webbing which is affixed thereto. The webbing may be affixed in any conventional way, including, but not limited to, stitching, ultrasonic welding, or adhesives. The nylon webbing is affixed to a major portion of the rear element. This webbing gives the rear element extra support and is to be positioned on a specific region of the patient's neck.

[0010] On the right and left side the webbing is no longer affixed to the back side of the rear element and circles about to a first anchor located in the front of the headpiece. The webbing is affixed in what may be termed an open trapezoidal

configuration, or an extended U-shape, and will be shown in the accompanying sketches and diagrams.

[0011] The back side of the rear element includes a right side and a left side. To the right side of the rear element is a first (right) connection element affixed to the back side of the rear element after the webbing mentioned above is no longer attached. To the left side of the rear element is a second (left) connection element affixed to the rear element after the webbing mentioned above is no longer attached.

10 [0012] The first connection element and the second connection element are securely affixed and have a generally vertical rectangular aperture located thereon. There is a first vertical rectangular aperture located on the right side, and a second vertical rectangular aperture located on the left side.

[0013] A first strap is provided. The first strap has a first side, a second side, a right side, a middle side and a left side. On the first strap first side is a cushioned portion, the cushioned portion being located on the middle side.

[0014] On the first strap second side the following configuration is found. On the left side is a plurality hooks associated with hook and loop fasteners. This is followed by a first portion of the strap. This is followed by a plurality of loops associated with hook and loop fasteners. The loops are located on the middle side.  
20 This is followed by a second portion of the strap. This is then followed by the right side which includes a plurality of hooks associated with hook and loop fasteners.

[0015] The rear element front side is placed against the patients neck, with the affixed webbed portion to be placed proximal the lowest part of the back of the skull. In this configuration, the neoprene rubber will be intermediate the webbing and the neck.

[0016] Then the first strap first side is placed on the forehead of the patient with the cushioned portion residing directly on the forehead. The first strap right side is placed through the first vertical rectangular aperture on the right side. The first strap left side is place through the second vertical rectangular aperture on the left side. On both the right and left side the strap should be pulled through its associated aperture until it reaches the portion of the strap which has no hook and loop fasteners located thereon. At that point, the strap is adjusted for comfort, and is bent about both the right and left apertures. This affixes the hook fasteners on both the right and left ends of the strap with the loop fasteners located on the middle of the strap, firmly securing the headpiece about the patients head. During the application of the headpiece, the patient should remove their eyeglasses. Also, hair should be positioned outside the headpiece.

[0017] At this point, the webbing with the anchor is pulled forward, basically parallel to the strap surrounding the head of the patient. The first anchor at the end of the webbing is attached to a cord. This attachment may be by a knot or another means of attachment.

[0018] A pulley system is placed in a door, with the door securing the pulley in place. This is done by placing a ball on the end of a cord which is then connected to the pulley. When the door closes on the cord intermediate the ball and the pulley,

the pulley is secured in place on one side of the door and the ball is secured in place on the other side of the door. The pulley acts as a force redirection means. Other devices may be used to redirect the force of the cord other than a pulley. Further, it is to be understood that other systems have been contemplated for mounting the pulley at an appropriate location and this system is not designed to be limiting. The ball (sphere) may be a square, rectangle, octagon or any other geometrical shape. This may be placed in a door with hinges and a knob, a sliding glass door, or other structure which has an open and closed position. For the sake of safety, one should ensure that the door not be opened while the therapy is proceeding. This may be done by a sign or other indicating means. In addition, the cord may be made from any material which has sufficient material properties to perform as required.

[0019] When the pulley has a force applied to it, the ball will prevent the pulley from moving with respect to its vertical position on the door. The cord may freely move about the pulley when force is applied to it. The cord attached to the first anchor is placed through the pulley, which redirects its direction. Other devices which can redirect force may be employed. For instance a generally circular disk with a groove radially oriented about the circumference could be adapted to retain the cord and permit sliding movement of the cord thereon.

[0020] The cord is then affixed to a second anchor. This second anchor in turn is affixed to a webbing which is designed to encircle the feet. When the webbing is placed about the feet, and the headpiece is on the patient, the patient merely needs to move there feet forward to produce traction on the neck. It is has also been considered that the cord may be lengthened and a loop tied at the distal

end. This would replace the second anchor and the webbing designed to encircle the feet.

[0021] The anchors, cord and webbing may all be made from any of a host of materials and this application is not intended to be limiting in the choice of materials. As before, any material with suitable material properties may be employed. In this case, the anchor must support certain forces, the webbing must be flexible and able to be affixed by sewing (or an another mechanical fastening arrangement), and the cord must have tensile properties so that it does not break or stretch too far.

10 [0022] The entire apparatus is designed to be placed in a bag which may be easily opened and closed for easy storage, retrieval and setup.

## FIGURES

[0023] Figure 1 is a view of the rear element back side of the headpiece.

[0024] Figure 2 is a view of the rear element front side of the headpiece.

[0025] Figure 3 is a view of the first strap (or forehead strap) second side.

[0026] Figure 4 is a view of the first strap (or forehead strap) first side.

[0027] Figure 5 is a view of the headpiece being applied to the patient's head.

[0028] Figure 6 is a view of the headpiece being attached to the patient's head, further connected by the anchor and cord to the pulley system.

[0029] Figure 7 is a view of the pulley mechanism.

20 [0030] Figure 8 is a patient employing the self-actuated cervical traction device.

## DETAILED DESCRIPTION OF THE FIGURES

[0031] Figure 1 is a view of the rear element back side **12** of the headpiece **10**. The back side **12** of the rear element **10** includes a right side **14** and a left side **16**. A nylon webbing **20** is stitched **22** to the rear element back side **12**. The nylon webbing **20** has a right wing **24** and a left wing **26**. Both the right wing **24** and the left wing **26** are angularly offset generally as shown by the intermediate or central portion **23**. The webbing **20** is no longer attached directly to the rear element back side **12** after the terminus of the right wing **24** and the left wing **26**. It is affixed in a sense as both terminating points of the wing elements affix the remaining webbing in what is essentially a loop **26**. Loop **26** is secured about a first anchor **28**.

[0032] The rear element back side **12** includes a right (first) connection element **30** and a left (second) connection element **32**. The right connection element **30** is secured to a the rear element back side **12** by a right portion of webbing **34**. The left connection element **32** is secured to the rear element back side **12** by a left portion of webbing **36**. The right connection element **30** and the left connection element **32** are designed to receive the forehead strap **50** shown best in Figures 3 & 4.

[0033] Referring now specifically to Figure 2, the rear element front side **40** is shown. Element **42** is the stitching to secure the nylon webbing **20**. Element **44** is the stitching to secure the right portion of webbing **34**. Element **46** is the stitching to secure the left portion of webbing **36**.



[0034] Referring now specifically to Figures 3 and 4 the forehead strap **50** is shown. Figure 3 shows the forehead strap's second side **55** and Figure 4 shows the forehead strap's first side **60**, the first side **60** which will reside against the forehead of the patient.

[0035] On Figure 3, we will examine the structure from left to right. First, along the entire length is a piece of strap. Element **70** is a first hook portion of hook and loop fasteners. Element **72** is a first strap portion. Element **74** is a loop portion of hook and loop fasteners. Element **76** is a second strap portion. Element **78** is a second hook portion.

10 [0035] On Figure 4 we will once again examine the structure from left to right. Again, the entire length is a piece of strap, this is the same strap discussed in Figure 4 but is being viewed from the other side. This is the first side **60** which will interface with the forehead of the patient. Starting with element **80**, the strap is again shown. Element **82** is padding which is affixed to the strap in order to be comfortable when the strap is tightened about the forehead. Element **84** is the strap again.

[0036] Referring now to Figure 5, we show the headpiece **10** affixed about the head of a patient **100**. The rear element front side **40** is placed about the neck of the patient **100** with the webbing **20** placed at the lowest part of the base of the skull. The forehead strap **50** is then placed on the patient with the padding **82** in  
20 direct contact with the forehead.

[0037] Right connection element **30** receives element **78** there-through and

the hook fasteners located on element **78** are pulled through and over connection element **30** where they are mated with the loop fasteners on element **74**. Left connection element **32** receives element **70** there-through and the hook fasteners located on element **78** are pulled through and over connection element **32** where they are mated with the loop fasteners on element **74**.

[0038] Figure 5 shows a portion of the secured webbing **20**, the right wing **24** and the loop **26**, as well as the first anchor **28**.

10 [0039] Referring now to Figure 6, a top view of the headpiece **10** is shown on the patient **100**. The forehead strap's first side **60** padding section **82** resides against the patient's forehead. The two end's of the strap are placed through the two connection elements and the hook and loop fasteners are engaged. Since the strap is symmetric, either side may be used and pulled through. In this view, we show the strap **50** with the padding against the forehead, with element **80** being placed through the right connection element **30** and element **84** being placed through the left connection element.

[0040] Anchor **28** is affixed to pulley **90** by a cord **92**. The pulley **90** in turn is secured intermediate a closed door **110** and a wall **120**. The pulley **90** is secured between the door **110** and the wall **120** because it is also affixed to a cord **122** which in turn is affixed to a ball **124**. This is shown in more detail in Figure 7.

20 [0041] Referring now to Figure 7, the pulley system is shown. Pulley **90** is

affixed by a cord **122** to a ball **124**. The cord **122** is placed intermediate a door **110** and a wall **120** and the door **110** is shut, securing the pulley **90** in place. It is to be understood that the cord **122** may be of a different diameter or the same diameter as cord **92**. Additionally, cord **122** may be made of the same or a different material than cord **92**. Ball **124** may be of any geometric shape that would prevent the cord **122** from being pulled through the shut door **110** and wall **120**. Additionally, the pulley system may be placed intermediate other devices which open and close, such as windows, sliding glass doors and the like.

10 [0042] Referring now to Figure 8, we see the Self-Actuated Cervical Traction Device fully deployed on the patient **100**. As seen, the headpiece **10** is placed on the head as previously described. The loop **26** is connected to the first anchor **28**, which in turn is affixed to cord **92**. Cord **92** passes through the pulley **90** of the pulley system where it passes over the body to a second anchor **94**. Second anchor **94** in turn is affixed to a second loop **95**. The second loop **95** may also be made from webbing material. The second loop **95** fits about the patient's feet **102**. By flexing the legs, the patient may gently place traction on the neck, which would assist in the treatment of a variety of ailments.

20 [0043] One must take care to ensure that the cord **92** is of a proper length for a given patient's physical dimensions. Additionally, one should take care to prevent the opening of the door during therapy.